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The Pleistocene reindeer of the North Sea—initial palaeontological data and archaeological remarks

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Abstract

The interdisciplinary North Sea Project aims at investigating the biotic history of the Pleistocene in the Southern Bight of the North Sea. Humans were part of these biotopes too as Palaeolithic flint artefacts prove. Based on a large fossil record and radiocarbon dating, it becomes clear that reindeer was part of the Late Pleistocene Mammoth-fauna.

Upper Palaeolithic hunters often are described as reindeer-hunters. Despite a large fossil reindeer record and collection of Palaeolithic flint artefacts, no evidence was found for co-existence of humans and reindeer or for reindeer-hunting.

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1. Introduction

Numerous fossilized remains of Pleistocene mammals have been retrieved from the North Sea floor (Mol et al., 2005, this volume). These mammals inhabited the area during limited periods of the Pleistocene, and especially Late Pleistocene fossils are salvaged by the tens of thousands every year. Through the North Sea project, interdisciplinary co-operation enables accurate dating, determination and study of this rich fossil fauna.

One research question is when and in what biotopes and climatic conditions reindeer, *Rangifer tarandus*, inhabited the area which now forms the North Sea floor; and especially whether or not reindeer co-existed with *Homo sapiens*, for whom reindeer was a common prey in the Upper Palaeolithic. As yet there is no evidence of such co-existence.

2. The North Sea project

In 2003, the North Sea Project was started in the Netherlands. This multi-year project involves the

participation of a number of universities and governmental institutes, establishing a frequent and close co-operation. The broad interdisciplinary approach combines isotope science, palaeontology, geology, palynology, dendrology, and archaeology.

The project's ambitious goal is to build a reliable empirical description of the biotic history of the Pleistocene in what is now the Southern Bight of the North Sea, situated between the British Isles and the Netherlands (Fig. 1). This empirical description consists, among other things, of the identification and dating of accumulated fossil materials.

Humans were present in Europe in the Middle and Late Pleistocene, and the gathered materials, along with numerous fossilized mammalian remains dating from the Pleistocene and Holocene, include artefacts, especially from the Palaeolithic and Mesolithic periods.

Flint tools, well-made hand axes amongst them (Fig. 2), are being retrieved from the loads which sand- and shell-dredgers now active in the area bring ashore in the Netherlands. In the same way, tools made of bone and antler have been collected (Fig. 3). Similar finds come from the drag-nets of fishing-boats which frequent the area.

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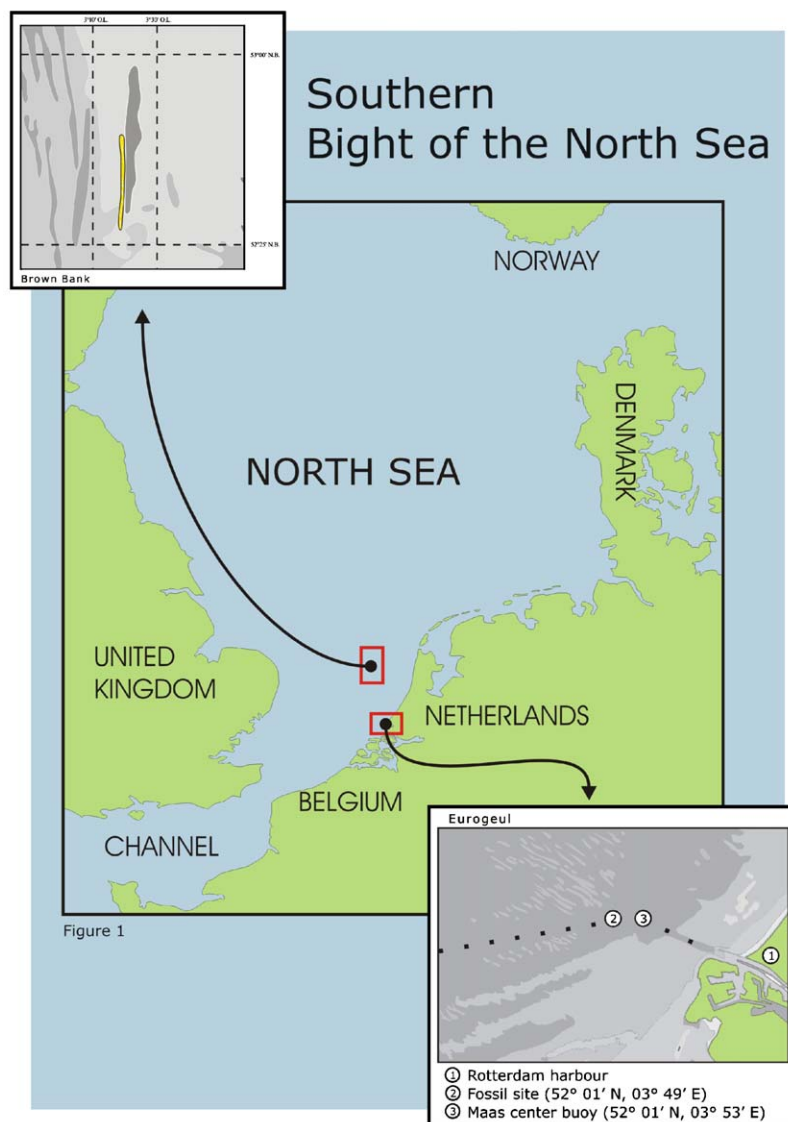


Fig. 1. Southern Bight of the North Sea with locations Brown Bank and Eurogeul.



Fig. 2. Palaeolithic flint artefact from the North Sea floor.

Palaeontology and archaeology meet here, in the analysis of what remains of the interaction between Palaeolithic humans and their environment, especially of the use they made of animal material. Upper Palaeolithic humans have often been described as reindeer-hunters. Hence, part of the project consists in systematically accumulating all fossil remains of reindeer as well as all artefacts made of bone and antler. A collection has been formed consisting of several thousands of reindeer fossil elements and over a 100 artefacts of the same material but of different animals, some made with extraordinary craftsmanship, but none of the reindeer bones or reindeer antlers collected thus far shows traces of human interference.



Fig. 3. Mesolithic artifacts of red deer antler and auroch bone from the North Sea floor.

Table 1
Results of ^{14}C dating of North Sea reindeer

Sample name	Laboratory number*	^{14}C age (BP) sigma	Geographical co-ordinates
GL02, Calcaneum	20,254	44,100 + 1250, –1100	52°44' N, 03°11' E
GL03, Metacarpal	20,255	39,150 + 700, –650	52°22' N, 03°06' E
GL05, Last Phalanx	20,257	39,200 + 700, –650	52°11' N, 02°48' E
GL06, Astragalus	20,294	29,460 \pm 250	52°11' N, 02°48' E
GL07, Astragalus	20,259	42,300 + 1000, –900	52°29' N, 03°07' E
GL08, Radius	20,260	41,200 + 900, –800	52°48' N, 02°46' E
GL09, Epistropheus	20,261	39,000 + 700, –600	53°06' N, 02°40' E
GL14, Metacarpal	20,303	>45,000	SW of the Brown Bank
GL15, Bone	20,475	>45,000	SW of the Brown Bank

*GrA—Groningen AMS.

3. The North Sea reindeer

R. tarandus is known from the Pleistocene and Holocene. It appeared in the Irvingtonian Cape Deceit fauna in Alaska about a million years ago (Geist, 1998). The oldest known fossils of *R. tarandus* in Europe were found in Süssenborn, Germany and dated at ca. 500,000 BP (Kurtén, 1968). Considering the geographical position of the North Sea, reindeer were expected to be part of the North Sea fauna from this time on. However, until now, reindeer remains were not found in the fauna of the Bavelien-complex (the latest period of the Early Pleistocene, ca. 1,000,000–800,000 BP; OIS 25–23), nor during the Middle and Early Late Pleistocene. It does, however, constitute a typical part of the Late Pleistocene Mammoth-fauna (Mol et al., 2005, this volume).

Radiocarbon dating has been carried out in order to obtain detailed insight into the occurrence of reindeer in this area. The results of the dating of random samples are listed in Table 1.

As can be inferred from the list, reindeer inhabited the area at least in the Late Pleistocene, but not continuously (note a similar conclusion for the late Quaternary

mammalian megafauna of the Taimyr Peninsula in MacPhee et al., 2002). Although it is difficult to infer this from the small number of dated elements, *R. tarandus* probably wandered in during three periods of favourable climate:

- One sample has been dated to 29,460 \pm 250 BP. This specimen lived, therefore, either at the close of the Denekamp-interstadial (a steppe-tundra with summer temperatures averaging 5–10 °C, ca. 29,000–32,000 BP) or during the transitional period between the interstadial and the polar desert of the Upper Pleniglacial (ca. 28,000–22,000, the Last Glacial Maximum, with summer temperatures on average hardly above the freezing-point) (Borman et al., 1984). Climate and flora of these periods formed an excellent environment for the animal.
- Six samples have been dated to ca. 44,000–39,000 BP. During the Middle Pleniglacial (ca. 28,000–50,000 BP), three interstadials can be discerned in the area (Denekamp, Hengelo, and Moershoofd) (Zagwijn, 1974). During the colder periods, the land was a steppe-tundra; during the interstadials, it was mostly

covered in low growth and birch. For the occurrence of reindeer, the dates suggest a cold period. Most likely, reindeer inhabited the area only during the colder stadials, but further research and dating must confirm or refute this hypothesis. However, *R. tarandus* certainly was part of the Mammoth-fauna. Samples of *Mammuthus primigenius* and *Coelodonta antiquitatis* from the area have been dated to the same period (43,800 (+600/–550) and 39,910 (+1070/–950) BP) (Mol et al., 2005, this volume).

- Finally, dates from two samples indicate that reindeer may have occurred in the area during an even earlier period, before 45,000 BP; as an estimate 45,000–100,000 BP. The degree of fossilization of the samples seems to preclude Early as well as Middle Pleistocene, since fossil remains from these periods are characterized by heavy mineralization.

It is remarkable that, at least until now, reindeer remains have not been found from the period after the last glacial. This cannot be ascribed to not “fishing” in the right sediments. During the last years, fishermen have sampled these sediments many times and consequently, remains of several species have been retrieved from the era after the last glacial.

4. Discussion and conclusions

At locations throughout Europe, fragments of man-made tools of bone and antler have been found, dated to the Middle and, especially, the Upper Palaeolithic (Gaudzinski, 1999). Although these finds are rare, one might expect, nevertheless, to find similar artefacts on the North Sea floor, dating in particular from the Upper Palaeolithic. Reindeer-hunting cultures, especially from the period of ca. 13,000–10,000 BP, frequently used reindeer material (see e.g. Rust, 1943).

Some of the collected material, dated to the Early and Middle Upper Palaeolithic bears marks which suggest human interference with the bones. This collection consists of more than a 100 bone pieces, especially of woolly mammoth, bison (*Bison priscus*) and horse (*Equus caballus*). The nature of the human involvement is currently under study.

Sophisticatedly carved tools from antler of red deer (*Cervus elaphus*) and bone of aurochs (*Bos primigenius*), definitely of Mesolithic age, have been salvaged. Many other finds imply that Mesolithic man hunted moose (*Alces alces*), horse, and boar (*Sus scrofa*) in the area (Louwe Kooijmans, 1971; Post, 2000). Recent finds from the North Sea which have been ¹⁴C dated confirm this hypothesis.

One of these more recent finds, a humerus of a wild boar which shows marks of cutting and breaking, has been ¹⁴C dated to 9450 ± 70 BP. Remarkably, skeletal parts of wild boar from the North Sea are very rare, yet no less than 28 similar fragments of humeri belonging to *S. scrofa* have been retrieved, all of them distal fragments which must have been deliberately broken by man, considering that they have all been chopped off in the same place and in the same way (Post, 2000). This constitutes apparent evidence of wild boar-butchery.

Humans must have inhabited the area and indeed remains of Mesolithic people have been recovered from the bottom of the North Sea; four fossil elements have been ¹⁴C dated. In addition, ¹⁴C dating of two recently found samples of red deer phalanges confirms that this animal inhabited the North Sea Basin during the same period as Mesolithic people did. Finally, the recent ¹⁴C dating of an artefact made of red deer antler constitutes further proof for the co-existence of Mesolithic man and red deer in the area (Table 2).

The findings provide proof that Mesolithic man lived and, probably, hunted in various ways in the North Sea Basin in wooded environments which formed the habitat of *C. elaphus* and *S. scrofa*.

Table 2
Results of ¹⁴C dating of North Sea red deer, wild boar and humans

Sample name	Laboratory number*	¹⁴ C age (BP)	sigma	Geographical co-ordinates
<i>Cervus elaphus</i>				
Modified antler	GrA 22999	8,070	50	Eurogeul
GL01, Second Phalanx	GrA 20353	8,350	50	52°27' N, 02°55' E
GL04, First Phalanx	GrA 20256	8,820	60	52°22' N, 03°06' E
<i>Sus scrofa</i>				
NO.2684, Humerus	UtC 7886	9,450	70	Southern Bight North Sea
<i>Homo sapiens</i>				
Mandible	GrA 23205	9,870	70	Southern Bight North Sea
NO.1063, Cranial bone	UtC 3750	9,640	400	52°10' N, 02°49' E
Cranial bone	?	8,340	130	Southern Bight North Sea
Mandible	GrA 11642	8,370	50	53°00' N, 02°54' E

*GrA—Groningen AMS; UtC—Utrecht AMS.

Reindeer bones or antler with marks of handling by man have as yet not been recovered from the North Sea floor. Judging from other finds, artefacts made of reindeer material may have been rare even in reindeer hunting cultures, though hunting and processing of the game created large bone assemblages with abundant traces of human exploitation of reindeer (e.g. Bratlund, 1994, 1996). Nevertheless, many fossilized remains of reindeer have been collected, as well as several Palaeolithic flint artefacts but nothing which indicates handling of reindeer bone or antler. Because a relatively large number of salvaged remains of Mesolithic red deer show marks of handling, one would expect to find at least some of the reindeer remains showing the same pattern, as reindeer-hunters are more focused on a single species and must have put the parts of the animal they hunted to many uses.

The absence of human-modified reindeer bones may be explained by hypothesizing that *R. tarandus* did not inhabit the area during the relatively warm periods, when humans did. The other possibilities suggested by the salvaged material are that in the Late Palaeolithic, either man was absent too from the area or that there may have been more than just reindeer cultures.

Of course, further research is needed to substantiate or falsify these tentative conclusions.

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